

Achieving Long-term Transitions towards Full Decarbonisation

Impulses from the *International Research Network for Low Carbon Societies*

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The transition towards full decarbonisation has reached the political agenda. In September 2016 in Wuppertal, scientists and politicians discussed ways to meet the climate targets.

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The 8th Annual Meeting of the *International Research Network for Low Carbon Societies (LCS-RNet)* was particularly important in the context of the follow-up to the G7 meeting in Elmau, the *Conference of the Parties (COP21)* in Paris and the preparation of the 6th *Assessment Report* of the Intergovernmental Panel on Climate Change (IPCC). Specifically, the success of the *Paris Agreement* has opened the gate to a transitional pathway towards complete decarbonisation. The international debate has shifted to the question of how to achieve low carbon societies, and the work and knowledge of the *LCS-RNet* has become even more significant in terms of the contribution it can make to achieving this aim.

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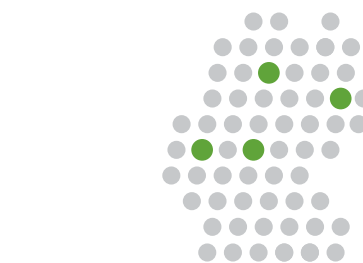
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The Annual Meeting was held from 6th to 7th September 2016 in Wuppertal, Germany (figure 1).¹ It was co-hosted by the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) and the Wuppertal Institute for Climate, Environment and Energy (WI) with support from Deutsche Forschungsgemeinschaft (DFG) and the Japanese Ministry of the Environment.

Key Issues for the Implementation of the Paris Agreement

The challenge of how to promote more concrete and practical actions to achieve the *Paris Agreement* targets was the focus of this year's Annual Meeting, which addressed the topic *How to Achieve Long-term Transitions towards Full Decarbonisation?* 40 speakers from the scientific, political and corporate sectors shared their knowledge. Speakers and participants from 13 different countries contributed their views and expertise over two days of discussions, resulting in successful conference outcomes. The following four sub-themes reflect the current key issues concerning long-term transitions.

¹ http://lcs-rnet.org/lcsrnet_meetings/2016/08/1895



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How to Trigger the Non-Linear Transition towards Full Decarbonisation?

The participants discussed the challenges of non-linear, disruptive developments and strategies to better understand how to counter these, as well as the associated implications for policymakers and companies. Furthermore, they examined possible ways of managing these challenges and discussed how to better involve non-state actors (including cities, industry and small enterprises).

One outcome of the sessions was an agreement that for the measures to succeed it is essential to engage stakeholders in a collaborative manner in the process of designing and implementing low carbon societies. These stakeholders should include members of national governments, cities/local governments, the public sector, the private sector (including industry and the financial sector), civil society, academia, media and international organisations.

Involving stakeholders in implementing low carbon societies is also required in the form of behavioural change. In addition to technological change, changes in behaviour are necessary to achieve radical and permanent decarbonisation corresponding to the 1.5 °C target. Therefore, all natural sciences, technological knowledge and social sciences will play an important role in

assessing options and finding solutions for system transformation and climate change mitigation.

Scenarios incorporating long-term policies are regarded as an important instrument, both for supporting decisions and as a means of communication with stakeholders. Since there is significant uncertainty about many aspects of future societies, economies and technologies, the creation of scenarios which depict a variety of potential future developments allows for the identification of robust solutions towards decarbonisation. Moreover, as a communication tool, scenarios can demonstrate potential future developments, raise awareness and initiate dialogue at multiple governance levels. In doing so, they facilitate transparency and stakeholder participation in transition processes towards low carbon societies.

2 How to Design Economic and Climate Policy to Foster “Green” Growth?

One of the most powerful strategies for triggering long-term decarbonisation is to match strategies for economic and wealth development with the necessary global investment programme for energy transition, climate mitigation and adaptation. The debate on this issue included the presentation

of lessons learned from financial instruments already implemented, carbon pricing initiatives and the redesign of financial instruments as a lever for change. Besides, a *Green Marshall Plan*, as a hedge against risks of secular stagnation, was discussed.

The participants agreed that the mitigation of systemic climate risks requires an integrated policy response. This includes information sharing, specific investment vehicles and instruments to assess risks to the stability of the financial system. Additional policy actions could encompass the extension of monetary policy objectives to increase the social value of carbon and the restoring of confidence in the financial system through collective insurance mechanisms and central bank interventions.

A concrete measure would be the foundation of institutions and the development of mechanisms for carbon reduction certificates that embody the positive value of carbon removal and are backed by guarantees from the major governments. Subsequent carbon pricing revenues could be a source of finance for infrastructure and sustainable development, especially in developing countries. This could help to meet two very important challenges simultaneously: poverty reduction and climate change mitigation.

Regarding climate finance, greater levels of public and private funding should be channelled towards green and low carbon investments, especially for supporting major innovations. In this way, a governance framework for effective climate finance in terms of both mitigation and adaptation could be elaborated, recognising emerging activities and technologies such as divestment and mitigation technologies in energy-intensive sectors.

How to Explore and Exploit the Synergies between the Sustainable Development Goals (SDGs) and Low Carbon Societies?

Due to the close relationship between these international goals, it is becoming increasingly evident that the process of designing low carbon transition pathways should be placed firmly in the context of the SDGs.

This requires researchers and policy-makers concerned with climate change to explicitly consider potential co-benefits like poverty eradication, access to basic infrastructure services (water, sanitation, electricity) and local pollution control.

Linking the goals also helps decision-makers to be aware of the potential negative cross impacts of their actions and consider solutions to trade-offs at early stages. For example, the design of climate protec-

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FIGURE 1: The 8th Annual Meeting of the International Research Network for Low Carbon Societies (LCS-RNet) took place in Wuppertal, Germany in September 2016. Conference co-chair Stefan Lechtenböhrer (in the middle) from the Wuppertal Institute for Climate, Environment and Energy welcomes international guests at the conference venue.



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tion measures targeting energy efficiency improvements and carbon reduction must take the whole supply chain and product-service system into account. This will allow for the assessment of the whole life cycle of the supply chain and, consequently, for the identification of optimum processes for resource extraction, conversion, operation, use, re-use, waste handling and recycling. Such analyses will also help the comprehensive assessment of renewable energy generation activities and mitigate the potential unintended negative consequences. For example, solar photovoltaic manufacturing activities will require strategies to minimise resource use and waste generation in an environmentally sustainable manner.

The fact that energy and material resource cycles are interconnected should also be considered within long-term scenarios. As most current energy scenarios do not take resource implications into account, a new approach is needed combining or integrating energy and resource scenarios.

Sub-themes discussed in this context included the identification of technological concepts and ambitions for carbon neutral or 100 percent renewable societies. Three sessions examined areas in which transitions to achieve the SDGs and low carbon societies are initiated: cities as hot spots of future sustainable development; low carbon energy-intensive industries; and sustainable production and consumption as core fields of transition.

4 What Role Does Science Play Regarding the SDGs and Climate Policy after Paris?

A roundtable discussion, which took place during a joint session between the LCS-RNet meeting and the 7th International Sustainability Transitions Conference (IST Con-

ference 2016), concluded that addressing climate change and the SDGs calls for science to adopt a new role. The processes and methods of science should be underpinned by the motto “service to society”. To achieve this goal, science needs to develop from a conventional paradigm to one that is transformative and transboundary. Consequently, the organisation within specialised departments and disciplines needs to be modified to create a new scientific approach that is interdisciplinary, transdisciplinary and multi-stakeholder based. This should include continuous interaction and dialogue between scientists and other stakeholders in society, including policymakers, non-governmental agencies, citizens and business. The research agenda and funding priorities might also change in some fields to reflect the new role of science. To effectively play a transformative role, science must act in the “common good”, rather than operate under private control.

An Inspiring Research Network

The LCS-RNet was established in 2008, based on Japan’s proposal at the G8 Environment Ministers’ Meeting. Recognising the need for countries to make the transition to low carbon societies, the Ministers strongly supported the establishment of the network to help develop a clear vision of a low carbon society and how a transition might be achieved. As a result, the LCS-RNet incorporates researchers and government representatives who make profound contributions to national climate policies. While the WI is Germany’s scientific representative, the BMUB links the German government to the network.

The LCS-RNet supports and encourages information sharing and voluntary cooperation among international research in-

stitutions, specifically in the field of low carbon society research². Furthermore, it facilitates interactions between researchers and stakeholders. A secretariat, located in Japan, manages the ongoing activities and brings all the threads together.

The results of the discussions – both between members of the network and with stakeholders – are reported at meetings of the *United Nations Framework Convention on Climate Change (UNFCCC)* and elaborated in academic journals. Moreover, the network’s findings are delivered to policymakers to assist in science-based national policy processes.

Cooperation is based on long-term mutual trust between research teams who work at a high scientific level; among others, 14 lead authors of the IPCC’s latest *Assessment Report (AR5)* are active members of the network. Furthermore, members of the LCS-RNet have provided their expertise for international climate negotiations. Prior to COP21, the network brought together 213 experts and scientists (amongst them 71 authors, chairs and co-chairs of the IPCC Working Group III, top-level development economists, five former ministers) from 47 countries in a position statement demanding an active climate policy underpinned by strong instruments.³

The 9th Annual Meeting will be hosted by the UK Energy Research Centre (UK-ERC) in the United Kingdom in 2017.

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² http://lcs-rnet.org/about_lcsrnet

³ http://lcs-rnet.org/lcsrnet_meetings/2015/10/1489

⁴ http://lcs-rnet.org/publications/#lcsrnet_annual_meeting_report